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09/586,072	06/02/2000	Bernd Andreas Edler	Edler 1-4	5463

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EXAMINER
HAN, QI

ART UNIT	PAPER NUMBER
2654	13

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/586,072	EDLER ET AL.	
	Examiner	Art Unit	
	Qi Han	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-33 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-33 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Information Disclosure Statement

The references listed in the Information Disclosure Statement submitted on 06/19/2003 have been considered by the examiner (see attached PTO-1449).

Response to Amendment

2. This communication is responsive to the applicant's amendment dated 07/07/2003 (Paper 11). Applicant amended claims 4, 5, 12, 16, 17, 19, 23, 24, 18 and 29.

3. The examiner withdraws the disclosure objection regarding abstract, because applicant made corrections and/or amendments.

4. The examiner withdraws the claim objections regarding claims 5, 17, 23, 38, 12 and 19, because applicant made corrections and/or amendments.

Response to Arguments

5. Applicant's arguments with respect to claims 1-33 (Page 11, amendment: page 8, line 17 through page 9, line 20) have been considered, but they are not persuasive.

In response to applicant's argument (regarding independent claims 1, 13,20, 25 and 30-33) that the prior arts "do not disclose or suggest" "said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masked threshold" (amendment: page 8, line 30 through page 9, line 7), the examiner has a different view of the prior art teachings and the claim interpretations. In fact, the previous office action has pointed that the prior art (Srinivasan) discloses "adaptive filter" and suggests affecting "magnitude response", (see rejection in previous office action regarding claim 1). As further evidence, Srinivasan teaches "adaptive wavelet structure" (page 1087, right column, second paragraph), "the filter bank structure adapts according to the signal-dependent noise-masking threshold information" (page 1089, right column, second paragraph), which clearly discloses adaptive filter and inherently suggests the effect to the output of magnitude. In addition, as broadly interpretation of the claim language, Srinivasan shows (see Fig. 1) that the input of the filter bank is also enters into psychoacoustic model that changes (inherently) parameters and/or internal states of the filter bank, so that the magnitude of the output of sub-band of the filter bank is "adaptive"; and discloses "the magnitude values of the frequency domain representation are converted to a critical band representation" and "it is a convex combination of the noise-masking-tone and the tone-masking-noise thresholds" (page 1087, left column, paragraph 4), which inherently suggests that the higher masking threshold, the lower value of the output magnitude needs to be encoded, which is interpreted as the claimed "that approximates an inverse of masked threshold".

Specification

6. The disclosure is objected to because of the following informalities:

On page 6, line 8, the phrase "does need not need to be transmitted..." appears to be "does not need to be transmitted..." Appropriate correction is required (applicant addressed this correction, but not add the change in the section of "marked version").

Claim Objections

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Regarding **claim 7**, the limitation of "an image signal" and "visibility threshold" lacks antecedent basis in the specification (applicant addressed the amendment regarding this claim, but not add the change in the section of "marked version").

Claim Rejections - 35 USC § 103

8. Claims 1, 6-9,13 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Srinivasan et al. (IEEE Transaction on signal processing, vol. 46, April 1998) hereinafter referenced as Srinivsan, in view of Johnston (USPN 5,481,614).

Regarding **claim 1**, Srinivasan discloses high-quality audio compression using an adaptive wavelet packet decomposition and psychoacoustic model. Srinivasan further discloses that an encoder/decoder (Fig. 1) comprises an encoder filter bank structure that has an input, an output, and is controlled by a psychoacoustic model, which has the same

input data and has a special output for controlling the filter bank structure (page 1086, right column, paragraph 2-4). Furthermore, Srinivasan teaches that the psychoacoustic model (Fig. 1) starts with the frequency domain representation, from which the noise-masking threshold for the critical bands are calculated (page 1087, left column, paragraph 3), and the magnitude values of the frequency domain representation are converted to a critical band representation and convolved with the spreading function (page 1087, left column, paragraph 4). Particularly, Srinivasan introduces the concept of subband perceptual rate, which is a measure that tries to adapt the subband structure to approach the psychoacoustic model as closely as possible (page 1086, right column, paragraph 4). This corresponds to the claimed "filtering said signal using an adaptive filter controlled by a psychoacoustic model, said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masked threshold." But, Srinivasan fails to specifically disclose "quantizing and encoding the filter output signal together with side information for filter adaptation control." However, the examiner contends that the concept of quantizing and encoding the filter output signal with side information was well known, as taught by Johnston.

In the same field of endeavor, Johnston discloses a method and apparatus for coding audio signals based on perceptual model. Johnston further discloses a quantizer and rate control processor 206 in coder (Fig. 2) that takes the outputs from the analysis bank and the perceptual

model, and allocates bits, noise, and controls other system parameters so as to meet the required bit rate for the given application (column 7, lines 19-31), an entropy encoder 208

is used to achieve a further noiseless compression in cooperation with the rate control processor 206 (column 7, lines 43-45), and the standardized side information (column 22, line 41). Johnston also discloses a filter bank 202 (Fig. 2) transforming an input audio signal in time/frequency domain (column 5, lines 46-57) and a perceptual model (not share input with the filter) processor 204 calculating an estimate of the perceptual importance and noise masking properties for providing improved control of the filtering operations (column 6, lines 16-34).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan by specifically providing a quantizer and encoder for the adaptive filter output signal with side information controlled by psychoacoustic model, as taught by Johnston, for the purpose of increase quality for the coding system.

Regarding **claim 6**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). Srinivasan discloses audio compression (page 1085, right column, paragraph 1), which satisfies the limitation of the claimed "said signal is an audio signal."

Regarding **claim 7**, as best understood in view of the claim objection (see above), Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). Srinivasan further suggests that the audio compression technique is adapted from image compression area, along with modifications to use the psychoacoustic model (page 1085, right column, paragraph 4 to (page 1086, left column, paragraph 1), so that the technique is inherently capable of applying image, which corresponds to the claimed "said signal is

an image signal and said adaptive filter is controlled in a way that said magnitude response approximates an inverse of a visibility threshold."

Regarding **claim 8**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). Srinivasan further shows that the bit stream output from decoder is transmitted to the input of decoder (Fig. 1) (page 1091, left column, paragraph 1), which corresponds to the claimed "the step of transmitting said encoded signal to a decoder."

Regarding **claim 9**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But, Srinivasan fails to expressly disclose "the step of recording said encoded signal on a storage medium." However, the examiner contends that the concept of recording said encoded signal on a storage medium was well known, as taught by Johnston.

Johnston further discloses that the compressed PAC signal is output to a communications channel/storage medium 106 (Fig. 1) (column 5, lines 26-27).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan by specifically providing a process for recording said encoded signal on a storage medium, as taught by Johnston, for the purpose of increasing reliability for coding system.

Regarding **claim 13**, Srinivasan discloses High-quality audio compression using an adaptive wavelet packet decomposition and psychoacoustic model. Srinivasan further discloses that an encoder/decoder (Fig. 1) comprises an encoder filter bank structure that has an input, an output, and is controlled by a psychoacoustic model, which has the same

input data and has a special output for controlling the filter bank structure (page 1086, right column, paragraph 2-4). Furthermore, Srinivasan teaches that the psychoacoustic model (Fig. 1) starts with the frequency domain representation, from which the noise-mars king threshold for the critical bands are calculated (page 1087, left column, paragraph 3), and the magnitude values of the frequency domain representation are converted to a critical band representation and convolved with the spreading function (page 1087, left column, paragraph 4). Particularly, Srinivasan introduces the concept of subband perceptual rate, which is a measure that tries to adapt the subband structure to approach the psychoacoustic model as closely as possible (page 1086, right column, paragraph 4), and employs the filter bank for implementing the spline-based biorthogonal wavelet transform for the coding process (page 1091, left column, paragraph 2). This corresponds to the claimed "filtering said signal using an adaptive filter controlled by a psychoacoustic model, said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masked threshold; and transforming the filter output signal using a plurality of subbands suitable for redundancy reduction." But, Srinivasan fails to specifically disclose "quantizing and encoding the subband signals together with side information for filter adaptation control." However, the examiner contends that the concept of quantizing and encoding the filter output signal with side information was well known, as taught by Johnston.

In the same field of endeavor, Johnston discloses a method and apparatus for coding audio signals based on perceptual model. Johnston further discloses a quantizer and rate control processor 206 in coder (Fig. 2) that takes the outputs from the analysis

bank and the perceptual model, and allocates bits, noise, and controls other system parameters so as to meet the required bit rate for the given application (column 7, lines 19-31), an entropy encoder 208 is used to achieve a further noiseless compression in cooperation with the rate control processor 206 (column 7, lines 43-45), and the standardized side information (column 22, line 41). Johnston also discloses a filter bank 202 (Fig. 2) transforming an input audio signal in time/frequency domain (column 5, lines 46-57) and a perceptual model (not share input with the filter) processor 204 calculating an estimate of the perceptual importance and noise masking properties for providing improved control of the filtering operations (column 6, lines 16-34).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan by specifically providing a quantizer and encoder for the adaptive filter output signal with side information controlled by psychoacoustic model, as taught by Johnston, for the purpose of increase quality for the coding system.

Regarding **claim 30**, it discloses an apparatus, which corresponds to the method of claim 1. The apparatus is obvious in that it simply provides structure for the functionality found in claim 1.

Regarding **claim 31**, it discloses an apparatus, which corresponds to the method of claim 13. The apparatus is obvious in that it simply provides structure for the functionality found in claim 13.

9. Claims 2, 5 10-12, 14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Srinivasan in view of Johnston further in view admitted prior art hereinafter referenced as admission.

Regarding **claim 2**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). Srinivasan further discloses a bit allocation mechanism (page 1090, left column, paragraph 1 to (page 1091, right column, paragraph 1), but he fails to specifically disclose that the "quantizing and encoding step uses a transform or analysis filter bank suitable for redundancy reduction." However, the examiner contends that the concept of using a filterbank for quantizing and encoding was well known, as taught by admission.

Admission cites that "the quantizer/coder stage 320 can include a filterbank such as the analysis filterbank 110 shown in Fig. 1" (page 6, line s 16-15), in which the reference 110 is well known as a prior art (page 2, lines 3-4, and drawing fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically providing analysis filterbank in quantizing and encoding step, as taught by admission, for the purpose of increasing the quality of the coding system.

Regarding **claim 5,** Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But, Srinivasan and Johnston fail to specifically disclose that "a filter order and the intervals of filter adaptation of said adaptive filter are selected suitable for irrelevancy reduction." However, the examiner contends that the concept of using a filterbank quantizing and encoding was well known, as taught by admission.

Admission further suggests that a well-know technique (frequency-warping) very efficient in approximation accuracy for a given filter order (page 9, lines 6-23).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically providing the well-know technique (frequency-warping) with a given filter order for achieving sufficient approximation accuracy, as taught by admission, for the purpose of increasing the quality for coding system.

Regarding **claim 10**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But, Srinivasan and Johnston fail to specifically disclose "said encoding further comprises the step of employing an adaptive Huffman coding technique." However, the examiner contends that the concept of using an adaptive Huffman coding technique was well known, as taught by admission.

Admission further discloses that adaptive Huffman coding is well-know coding technique (page 6, line 9).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically providing the adaptive Huffman coding technique in the encoding process, as taught by admission, for the purpose of increasing coding efficiency.

Regarding **claim 11**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But, Srinivasan and Johnston fail to specifically disclose "said filtering step is based on a frequency warping technique using a non-linear frequency scale." However, the examiner contends that the concept of providing a

frequency warping technique using a non-linear frequency scale was well known, as taught by admission.

Admission further discloses that the frequency warping technique has described by Strube (page 9, line 8), and also suggests that the frequency scale reflecting the non-linearity of the critical band scale is well known (page 9, lines 16-21).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically providing the frequency warping technique using a non-linear frequency scale, as taught by admission, for the purpose of increasing coding efficiency.

Regarding **claim 12**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But, Srinivasan and Johnston fail to specifically disclose that "coding stage for filter coefficients comprises a conversion from linear-predictive coefficient filter coefficients to lattice coefficients or to Line Spectrum Pairs." However, the examiner contends that the concept of providing LPC filter coefficients to lattice or to Line Spectrum Pairs for encoding process was well known, as taught by admission.

Admission further discloses that the techniques for speech coding, such as linear-predictive coefficient (LPC) and line spectral pairs (LSP) are well known (page 4, lines 20-25, and page 7, lines 16-30).

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically applying the well known techniques of LPC filter coefficients and line spectrum pairs for converting, as taught by admission, for the purpose of increasing compatibility for the coding system.

Regarding **claim 14**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 13). This rejection is, in addition, based on the same reason of the rejection for the limitation described in claim 2 because it is obvious in that claim 14 has the same functionality as claim 2.

Regarding **claim 17**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 13). This rejection is, in addition, based on the same reason of the rejection for the limitation described in claim 5 because it is obvious in that claim 17 has the same functionality as claim 5.

Regarding **claim 18**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 13). This rejection is, in addition, based on the same reason of the rejection for the limitation described in claim 11 because it is obvious in that claim 18 has the same functionality as claim 11.

Regarding **claim 19**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 13). This rejection is, in addition, based on the same reason of the rejection for the limitation described in claim 12 because it is obvious in that claim 19 has the same functionality as claim 12.

10. Claims 3-4, 15-16, 20-29 and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Srinivasan in view of Johnston and further in view of well known prior art (MPEP 2144.03).

Regarding **claim 3**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But Srinivasan and Johnston fail to specifically disclose that

the "quantizing and encoding steps employ fixed quantizer step sizes." However, the examiner takes official notice of the fact that it was well known in the art to provide quantizing and encoding steps with fixed quantizer step sizes.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically providing quantizing and encoding steps with fixed quantizer step sizes, for the purpose of further reducing transition rate for a coding system.

Regarding **claim 4**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 1). But Srinivasan and Johnston fail to specifically disclose that the "quantizing and encoding step reduces the mean square error in said signal." However, the examiner takes official notice of the fact that it was well known in the art to reduce the mean square error (MSE) in said signal in quantizing and encoding step.

Therefore, it would have been obvious to one of ordinary skill in the art at time the invention was made to modify Srinivasan and Johnston by specifically providing quantizing and encoding steps for reducing the mean square error (MSE) in said signal, for the purpose of further increasing quality for a coding system.

Regarding **claim 15**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 13). This rejection is, in addition, based on the same reason of the rejection for the limitation described in claim 3 because it is obvious in that claim 15 has the same functionality as claim 3.

Regarding **claim 16**, Srinivasan and Johnston disclose everything claimed, as applied above (see claim 13). This rejection is, in addition, based on the same reason of

the rejection for the limitation described in claim 4 because it is obvious in that claim 16 has the same functionality as claim 4.

Regarding **claims 20-24**, they disclose a method for decoding, which corresponds to an inverse method of claims 1, 2, 3, 5 and 12, respectively. The inverse method is obvious in that it simply provides functionally reversed process for the method found in claims 1, 2, 3, 5 and 12, respectively.

Regarding **claims 25-29**, they disclose a method for decoding, which corresponds to a inverse method of claims 13,14, 15, 17 and 19, respectively. The inversed method is obvious in that it simply provides functionally reversed process for the method found in claims 13,14, 15, 17 and 19, respectively.

Regarding **claim 32**, it discloses an apparatus, which corresponds to the method of claim 20. The apparatus is obvious in that it simply provides structure for the functionality found in claim 20.

Regarding **claim 33**, it discloses an apparatus, which corresponds to the method of claim 25. The apparatus is obvious in that it simply provides structure for the functionality found in claim 25.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any response to this office action should be mailed to:
Commissioner of Patents and Trademarks, P.O. Box 1450, Alexandria, VA22313-1450
or faxed to:
(703)-872-9314
Hand-delivered responses should be brought to:
Crystal Park II, 2121 Crystal Drive, Arlington. VA. Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. and Friday from 8:00 a.m. to 12:00 a.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-6954.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

QH/qh
September 18, 2003

Richemond Dorvil
Primary Examiner